Space Weather Forecast

Issued on Saturday 22 February 2025 at 00:24 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate flares likely. Possible glancing CMEs Days 2-3 (23-24 Feb).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was Moderate following two Moderate flares from a developing region near north centre disc, with the peak flare at 21/1215 UTC.

There are currently nine sunspot regions on the visible disc. The most notable regions are now at south centre disc and approaching north centre disc. The region in the south continues to show spot development and magnetic complexity. The region in the north has developed rapidly in the last 24 hours, with magnetic complexity also developing. A further region in the southwest remains of interest, but despite its length it is straightforward magnetically, and currently appears stable. The other regions on the disc are smaller and simpler at the present time.

A Coronal Mass Ejection (CME) lifted off in the northwest, starting around 21/1000 UTC, which is currently being assessed but is considered unlikely to have an Earth directed component. No other Earth directed CMEs have been seen in the last 24 hours.

Solar Wind / Geomagnetic Activity: Solar winds showed background conditions. Wind speeds varied between 300-400 km/s. Interplanetary Magnetic Field was weak with the north-south component also varying weakly, but with a southward bias. Geomagnetic activity was Quiet to Unsettled (Kp 0-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was very slightly elevated above the normal background level, but well below the S1/Minor radiation storm threshold.

Four-Day Space Weather Forecast Summary

Solar Activity: The flare probability has been increased, mainly due to the development of the region approaching north centre disc, with Moderate flares now considered likely and a slight chance of Strong flares.

Solar Wind / Geomagnetic Activity: There have been several CMEs over the last few days, with confidence in this aspect of the forecast very low. There are two main features which may have the potential to affect Earth. Glancing blows are possible around the middle of the day (UTC) on

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Day 2 (23 Feb) and again on Day 3 (24 Feb). In addition, late Day 3 or Day 4 (24-25 Feb) a slight fast wind enhancement may occur, however at most wind speeds may become slightly elevated around 400-450 km/s.

Geomagnetic activity is forecast to be mainly Quiet to Unsettled at first, but activity may increase to give a chance of G1/Minor Storm (Kp 5) intervals and a slight chance of G2/Moderate Storm (Kp 6) intervals on Days 2-3 mainly due to the risk of CME influence.

Energetic Particles / Solar Radiation: The count rate of energetic particles is likely to persist at background levels, but with a slight chance of increasing above the S1/Minor radiation storm threshold in response to any larger flares.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	30	30	10
Strong	G3	No	1	5	5	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	60	60	60	60
Very Active	R3-R5 (X Class)	No	10	10	10	10

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	10	15	15	15
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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